

# SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

2102-F-21-R-43

**Name:** East Vermillion Lake

**County:** McCook

**Legal Description:** T102N-R53W-Sec. 14-15, 22-23, 26-27, 33-35

**Location from nearest town:** 5 miles east, 1 mile south of Canistota, SD

**Dates of present survey:** July 12-14, 2010 (netting); Sept.27, 2010 (electrofishing)

**Dates of last survey:** July 13-15, 2009 (netting); Sept.15, 2009 (electrofishing)

Managed Species	Other Species
Walleye	Yellow Perch
Black Crappie	White Crappie
Bluegill	Northern Pike
Black Bullhead	Freshwater Drum
Channel Catfish	Common Carp
Largemouth Bass	White Sucker

## PHYSICAL DATA

**Surface area:** 513 acres

**Maximum depth:** 23 feet

**Volume:** 6,600 acre feet

**Contour map available?** Yes

**Lake elevation observed during the survey:** Full +

**Beneficial use classification:** (4) warmwater permanent fish propagation, (7) immersion recreation, (8) limited-contact recreation, (9) fish and wildlife propagation and stock watering.

**Watershed area:** 264,789 acres

**Mean depth:** 12 feet

**Shoreline length:** 10.1 miles

**Date prepared:** 1974

## Introduction

East Vermillion Lake, commonly known as Lake Vermillion, is an impoundment formed by the construction of a dam across the East Vermillion River in 1958. Battle Creek is a secondary tributary that forms the west arm of the lake. A low-level outlet gate can be opened for flood control and dam maintenance purposes. In April and July 1993, the primary and secondary spillways suffered significant damage during flood events. In March 1994, the primary spillway was undermined and collapsed due to the previous year's damage. The primary spillway was repaired by spring 1995.

## Ownership of Lake and Adjacent Lakeshore Properties

East Vermillion Lake is owned and managed by the Parks and Wildlife Divisions of the South Dakota Department of Game, Fish and Parks (GFP). Together, the two divisions own 1,826 acres which includes the surface area of the lake. Public use easements grant the public the right to access and use a strip of land 50 feet wide outside the high water contour of the lake.

## Fishing Access

The West Recreation Area, a fee area managed by the Parks Division, has a double lane boat ramp with a dock, public toilet, handicapped fishing dock, modern campground, fish cleaning station, swimming beach, and shore fishing access. There is vehicle access to shore-fishing areas in the western arm of the lake. The East Recreation Area, also a fee area managed by the Parks Division, has a double lane boat ramp with a dock, public toilet, campground, and shore fishing access.

## Field Observations of Water Quality and Aquatic Vegetation

Scattered beds of sago pondweed (*Potamogeton pectinatus*) were common throughout the lake. Cattails (*Typha spp.*) and duckweed (*Lemna spp.*) were also observed. The water was fairly clear with a Secchi depth measurement of 71 cm (28 in).

## **BIOLOGICAL DATA**

### Methods:

East Vermillion Lake was sampled on July 12-14, 2010 with four overnight gill-net sets and ten overnight trap-net sets. The trap nets are constructed with 19-mm-bar-mesh ( $\frac{3}{4}$  in) netting, 0.9 m high x 1.5 m wide (3 ft high x 5 ft wide) frames and 18.3 m (60 ft) long leads. The gill nets are 45.7 m long x 1.8 m deep (150 ft long x 6 ft deep) with one 7.6 m (25 ft) panel each of 13, 19, 25, 32, 38 and 51-mm-bar-mesh ( $\frac{1}{2}$ ,  $\frac{3}{4}$ , 1,  $1\frac{1}{4}$ ,  $1\frac{1}{2}$ , and 2 in) monofilament netting. Two hours of nighttime electrofishing was done on Sept. 27, 2010 to evaluate walleye recruitment. Sampling locations are displayed in Figure 5.

## **Gill Net Catch**

Black bullheads comprised 59.6% of the gill net catch this year (Table 1). Other species sampled included white sucker, walleye, yellow perch, white crappie, black crappie, northern pike, freshwater drum, common carp, channel catfish, and orange-spotted sunfish.

**Table 1.** Total catch from four overnight gill net sets at East Vermillion Lake, McCook County, July 12-14, 2010.

Species	No.	%	CPUE <sup>1</sup>	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Black Bullhead	236	59.6	59.0	$\pm 25.7$	129.5	53	0	95
White Sucker	74	18.7	18.5	$\pm 2.0$	5.9	93	82	105
Walleye	42	10.6	10.5	$\pm 3.1$	10.8	40	0	85
Yellow Perch	17	4.3	4.3	$\pm 1.0$	18.5	47	35	106
White Crappie	8	2.0	2.0	$\pm 1.8$	0.6	--	--	--
Black Crappie	8	2.0	2.0	$\pm 0.7$	0.8	--	--	--
Northern Pike	4	1.0	1.0	$\pm 0.9$	0.9	--	--	--
Freshwater Drum	3	0.8	0.8	$\pm 0.6$	0.0	--	--	--
Common Carp	2	0.5	0.5	$\pm 0.4$	1.3	--	--	--
Channel Catfish	1	0.3	0.3	$\pm 0.3$	3.5	--	--	--
O. S. Sunfish	1	0.3	0.3	$\pm 0.3$	0.0	--	--	--

\* 10 years (2000-2009)

<sup>1</sup> See Appendix A for definitions of CPUE, PSD, and mean Wr.

**Table 2.** Catch per unit effort by length category for various fish species captured with gill nets in East Vermillion Lake July 12-14, 2010.

Species	Substock	Stock	S-Q	Q-P	P+	All sizes	80% C.I.
Black Bullhead	--	59.0	28.0	31.0	--	59.0	±25.7
White Sucker	--	18.5	1.3	2.0	15.0	18.5	±2.0
Walleye	4.3	6.3	3.8	2.5	--	10.5	±3.1
Yellow Perch	--	4.3	2.3	0.5	1.5	4.3	±1.0
White Crappie	--	2.0	1.8	0.3	--	2.0	±1.8
Black Crappie	--	2.0	1.3	0.7	--	2.0	±0.7
Northern Pike	--	1.0	0.5	0.3	0.3	1.0	±0.9
Freshwater Drum	0.3	0.5	0.5	--	--	0.8	±0.6
Common Carp	0.3	0.3	--	0.3	--	0.5	±0.4
Channel Catfish	--	0.3	--	0.3	--	0.3	±0.3
O. S. Sunfish*	--	--	--	--	--	0.3	±0.3

\*No length categories established. Length categories can be found in Appendix A.

### **Trap Net Catch**

Black bullheads were also the most abundant species (60.7%) sampled in the trap nets (Table 3). Twelve additional species were also sampled.

**Table 3.** Total catch from ten overnight trap net sets at East Vermillion Lake, McCook County, July 12-14, 2010.

Species	No.	%	CPUE	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Black Bullhead	395	60.7	39.5	±19.3	671.9	33	1	90
Black Crappie	113	17.4	11.3	±5.6	5.2	47	3	110
White Sucker	44	6.8	4.4	±2.4	2.9	100	98	112
Bluegill	21	3.2	2.1	±1.2	10.7	57	10	115
Common Carp	18	2.8	1.8	±0.9	4.0	65	41	95
Walleye	17	2.6	1.7	±0.7	1.7	73	13	80
Yellow Perch	15	2.3	1.5	±1.5	1.5	1	0	98
Freshwater Drum	10	1.5	1.0	±0.9	0.0	--	--	--
O. S. Sunfish	7	1.1	0.7	±0.4	0.0	--	--	--
Northern Pike	7	1.1	0.7	±0.4	2.1	--	--	--
Channel Catfish	2	0.3	0.2	±0.3	3.1	--	--	--
Green Sunfish	1	0.2	0.1	±0.1	0.1	--	--	--
White Crappie	1	0.2	0.1	±0.1	1.4	--	--	--

\* 10 years (2000-2009)

**Table 4.** Catch per unit effort by length category for various fish species captured with trap nets in East Vermillion Lake July 12-14, 2010.

Species	Substock	Stock	S-Q	Q-P	P+	All sizes	80% C.I.
Black Bullhead	3.6	35.9	24.1	11.4	0.4	39.5	±19.3
Black Crappie	--	11.3	6.0	5.0	0.3	11.3	±5.6
White Sucker	--	4.4	--	0.1	4.3	4.4	±2.4
Bluegill	--	2.1	0.9	1.0	0.2	2.1	±1.2
Common Carp	0.1	1.7	0.6	0.4	0.7	1.8	±0.9
Walleye	0.2	1.5	0.4	0.9	0.2	1.7	±0.7
Yellow Perch	--	1.5	1.2	0.3	--	1.5	±1.5
Freshwater Drum	0.3	0.5	0.5	--	--	1.0	±0.9
O. S. Sunfish*	--	--	--	--	--	0.7	±0.4
Northern Pike	0.1	0.6	0.2	0.1	0.3	0.7	±0.4
Channel Catfish	--	0.2	--	0.2	--	0.2	±0.3
Green Sunfish	--	0.1	0.1	--	--	0.1	±0.1
White Crappie	--	0.1	0.1	--	--	0.1	±0.1

\*No length categories established. Length categories can be found in Appendix A.

## **Walleye**

**Management objective:** Maintain a walleye fishery with a gill-net CPUE of at least 15 and PSD range of 30-60.

Walleye gill-net CPUE remains just below the management objective and 10-year mean (Table 5). Mostly age-1 fish were sampled (Table 6), growth was within previously observed ranges and  $W_r$  was below average.

Natural reproduction produced another large year class in 2010 (Table 7). The abundant age-0 walleyes were large despite a  $W_r$  lower than seen in past years. Age-1 fish were also abundant as expected based on the numbers of age-0 fish caught electrofishing in fall 2009 and the high abundance of age-1 fish in the summer gill nets. Growth of age-1 walleyes in 2010 was better than in previous years.

**Table 5.** Walleye gill net CPUE, PSD, RSD-P and mean  $W_r$  in East Vermillion Lake, McCook County, 2001-2010.

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Mean*
CPUE	14.5	17.5	8.3	4.8	9.8	17.8	8.8	10.0	7.3	10.5	10.8
PSD	42	53	78	89	50	60	59	0	21	40	48
RSD-P	7	8	25	28	15	4	15	0	4	0	11
Mean $W_r$	83	91	90	88	92	98	86	89	94	85	90

\*10 years (2000-2009)

**Table 6.** Weighted mean length at capture (mm) for walleye captured in gill nets in East Vermillion Lake, McCook County, 2003-2010. Note: sampling was conducted at approximately the same time during each year allowing comparisons among years to monitor growth trends. Sample size in parentheses.

Year	1	2	3	4	5	6	7	8	9	10	11	12
<b>2010</b> (39)	255 (28)	--	408 (3)	438 (8)	--	--	--	--	--	--	--	--
<b>2009</b> (28)	--	291 (4)	351 (23)	555 (1)	--	--	--	--	--	--	--	--
<b>2008</b> (40)	216 (2)	290 (37)	372 (1)	--	--	--	--	--	--	--	--	--
<b>2007</b> (35)	270 (6)	323 (5)	387 (5)	392 (5)	461 (2)	446 (2)	468 (3)	518 (3)	552 (1)	629 (2)	478 (1)	--
<b>2006</b> (71)	229 (18)	325 (19)	418 (20)	--	448 (5)	457 (5)	510 (3)	--	531 (1)	--	--	--
<b>2005</b> (34)	288 (10)	369 (9)	--	440 (8)	467 (2)	522 (3)	596 (1)	641 (1)	--	--	--	--
<b>2004</b> (19)	249 (3)	--	391 (2)	461 (6)	505 (4)	557 (1)	505 (1)	613 (2)	--	--	--	--
<b>2003</b> (32)	--	299 (4)	400 (10)	446 (7)	486 (4)	535 (3)	587 (2)	626 (2)	--	--	--	--

**Table 7.** Age-0 and age-1 walleyes sampled during two hours of nighttime electrofishing on East Vermillion Lake, McCook County, 2000-2010.

Year	Stocking	Age-0 CPH	80% C.I.	% stocked	Mean length (range; mm)	Wr	Age-1 CPH	80% C.I.	Mean length (range; mm)	Wr
2010	none	102	74-130		172 (138-220)	81	24	18-30	(238-343)	
2009	none	164	83-245		174 (135-190)	97	7	2-12	206 (205-211)	98
2008	none	35	13-57		188 (170-215)	98	2	0-5	226 (226-226)	83
2007	none	23	8-38		151 (131-151)	75	156	78-234	221 (171-262)	81
2006	fingerling	326	213-439	8	144 (116-205)	85	2	0-6	254 (212-268)	92
2005	none*	39	27-51		201 (152-230)	98	3	1-5	228 (220-230)	93
2004	none	44	34-54		193 (154-215)	86	1	0-2	303 (290-315)	86
2003	none	84	60-108		178 (134-209)	97	1	0-2	272 (255-286)	87
2002	none	7	2-12		169 (161-185)	96	196	138-254	271 (224-315)	89
2001	none	202	136-268		169 (129-216)	94	43	28-57	296 (245-330)	91
2000	none	231	117-345		200 (150-228)	103				

\*16,544 large fingerlings were stocked in October 2005 after electrofishing

## **Black Crappie**

**Management objective:** Maintain a black crappie fishery with a trap net CPUE of at least 20 and PSD of at least 40 in three of ten surveys.

Black crappie trap-net CPUE increased this year to a level not seen since 2002 (Table 8). This was most likely the result of adult stockings made in 2009 and 2010 (Table 12 and Figure 2).

**Table 8.** Black crappie trap-net CPUE, PSD, and mean Wr in East Vermillion Lake, McCook County, 2001-2010.

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Mean*
CPUE	20.9	14.5	2.2	0.5	0.3	1.1	0.9	0.3	0.5	11.3	5.2
PSD	23	93	95	--	--	--	--	--	--	47	78
RSD-P	19	2	15	--	--	--	--	--	--	3	10
Mean Wr	167	119	107	--	--	--	--	--	--	110	128

\*10 years (2000-2009)

## **Bluegill**

**Management objective:** Maintain a bluegill fishery with a trap net CPUE of at least 20 and RSD-18 of at least 20 in three of ten surveys.

Bluegill trap-net CPUE increased slightly but is still very low due to several consecutive years of poor natural recruitment (Table 9). Bluegills were stocked in 2009 and 2010 but their contribution to the population appears minimal.

**Table 9.** Bluegill trap-net CPUE, PSD, RSD-18, RSD-P, and mean Wr in East Vermillion Lake, McCook County, 2001-2010.

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Mean*
CPUE	9.2	21.0	41.1	14.7	6.6	4.9	2.5	3.6	0.8	2.1	10.7
PSD	13	100	100	100	100	44	96	97	--	57	80
RSD-18	2	63	98	99	100	33	32	94	--	19	63
RSD-P	1	51	55	78	97	33	28	69	--	10	50
Mean Wr	138	128	112	110	115	131	122	114	--	115	123

\*10 years (2000-2009)

## **Black Bullhead**

**Management objective:** Maintain a black bullhead population with a trap-net CPUE of less than 100.

Black bullhead trap-net CPUE has declined and now satisfies the management objective (Table 10). Nearly one third of the bullheads sampled were over 23 cm (9 in) but there were very few over 25 cm (10 in) (Figure 4).

**Table 10.** Black bullhead trap-net CPUE and PSD for East Vermillion Lake, McCook County, 2001-2010.

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Mean*
CPUE	291.8	190.2	473.1	1,574.0	258.8	2,718.8	534.1	78.9	491.4	39.5	671.9
PSD	30	58	27	19	91	2	2	83	8	33	41
RSD-P	9	7	1	0	0	0	0	0	0	1	3
Mean Wr	100	102	98	93	93	89	90	94	88	90	94
Mean Length		223	216	213	244	157	196	221	167	214	205

\*10 years (2000-2009)

## **All Species**

Freshwater drum and white sucker CPUE increased this year while CPUE for all other species was within previously observed ranges (Table 11).

**Table 11.** Gill-net (GN) and trap-net (TN) CPUE for all fish species sampled in East Vermillion Lake, McCook County, 2001-2010.

<b>Species</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>
<b>COC (GN)</b>	1.2	0.5	0.3	0.3	0.8	3.0	3.8	2.0	0.8	0.5
<b>COC (TN)</b>	1.5	6.4	1.2	1.4	6.3	2.3	8.2	7.5	0.3	1.8
<b>WHS (GN)</b>	5.7	0.7	4.5	2.8	4.5	3.0	8.3	10.0	10.0	18.5
<b>WHS (TN)</b>	1.4	4.4	0.8	0.1	1.7	2.1	1.6	2.5	5.2	4.4
<b>BLB (GN)</b>	70.5	146.5	233.3	169.5	124.0	174.5	98.8	86.8	131.3	59.0
<b>BLB (TN)</b>	291.8	190.2	473.1	1574	258.8	2718.8	534.1	78.9	491.4	39.5
<b>CCF (GN)</b>	0.2	0.7	3.5	1.5	5.0	10.8	2.8	3.8	5.5	0.3
<b>CCF (TN)</b>	0.2	0.2	4.7	9.2	6.6	3.1	3.1	2.7	0.3	0.2
<b>NOP (GN)</b>	1.0	2.5	--	0.3	0.8	--	0.5	0.8	0.3	1.0
<b>NOP (TN)</b>	1.6	8.6	1.3	1.2	0.6	1.3	0.2	1.0	0.3	0.7
<b>OSF (GN)</b>	--	--	--	--	--	--	--	--	0.3	0.3
<b>GSF (TN)</b>	--	0.1	--	--	--	0.3	0.1	0.1	--	0.7
<b>BLG (GN)</b>	0.5	1.2	--	0.5	--	--	--	--	--	--
<b>BLG (TN)</b>	9.2	21.0	41.1	14.7	6.6	4.9	2.5	3.6	0.8	2.1
<b>HYB (TN)</b>	--	0.2	0.1	--	--	--	--	--	--	--
<b>LMB (TN)</b>	--	0.5	0.1	0.3	0.3	0.3	--	--	--	--
<b>WHC (GN)</b>	2.7	2.5	--	0.3	0.3	0.3	--	--	--	2.0
<b>WHC (TN)</b>	4.4	6.4	1.3	1.2	0.3	--	0.2	--	0.1	0.1
<b>BLC (GN)</b>	1.7	3.2	0.8	0.3	--	0.3	--	0.3	0.3	2.0
<b>BLC (TN)</b>	20.9	14.5	2.2	0.5	0.3	1.1	0.9	0.3	0.5	11.3
<b>YEP (GN)</b>	47.2	42.5	28.8	21.3	8.8	6.3	7.3	11.5	2.8	4.3
<b>YEP (TN)</b>	4.0	4.7	1.6	0.6	0.4	1.5	0.7	0.1	0.1	1.5
<b>WAE (GN)</b>	14.5	17.5	8.3	4.8	9.8	17.8	8.8	10.0	7.3	10.5
<b>WAE (TN)</b>	1.4	3.9	2.1	1.3	0.3	0.1	2.2	2.2	1.7	1.7
<b>FRD (GN)</b>	--	--	--	--	--	0.3	--	--	--	0.8
<b>FRD (TN)</b>	--	--	--	--	--	--	--	0.1	0.1	1.0

COC (Common Carp), WHS (White Sucker), BLB (Black Bullhead), CCF (Channel Catfish), NOP (Northern Pike), GSF (Green Sunfish), BLG (Bluegill), HYB (Hybrid Sunfish), SMB (Smallmouth Bass), LMB (Largemouth Bass), WHC (White Crappie), BLC (Black Crappie), YEP (Yellow Perch), WAE (Walleye), FRD (Freshwater Drum)

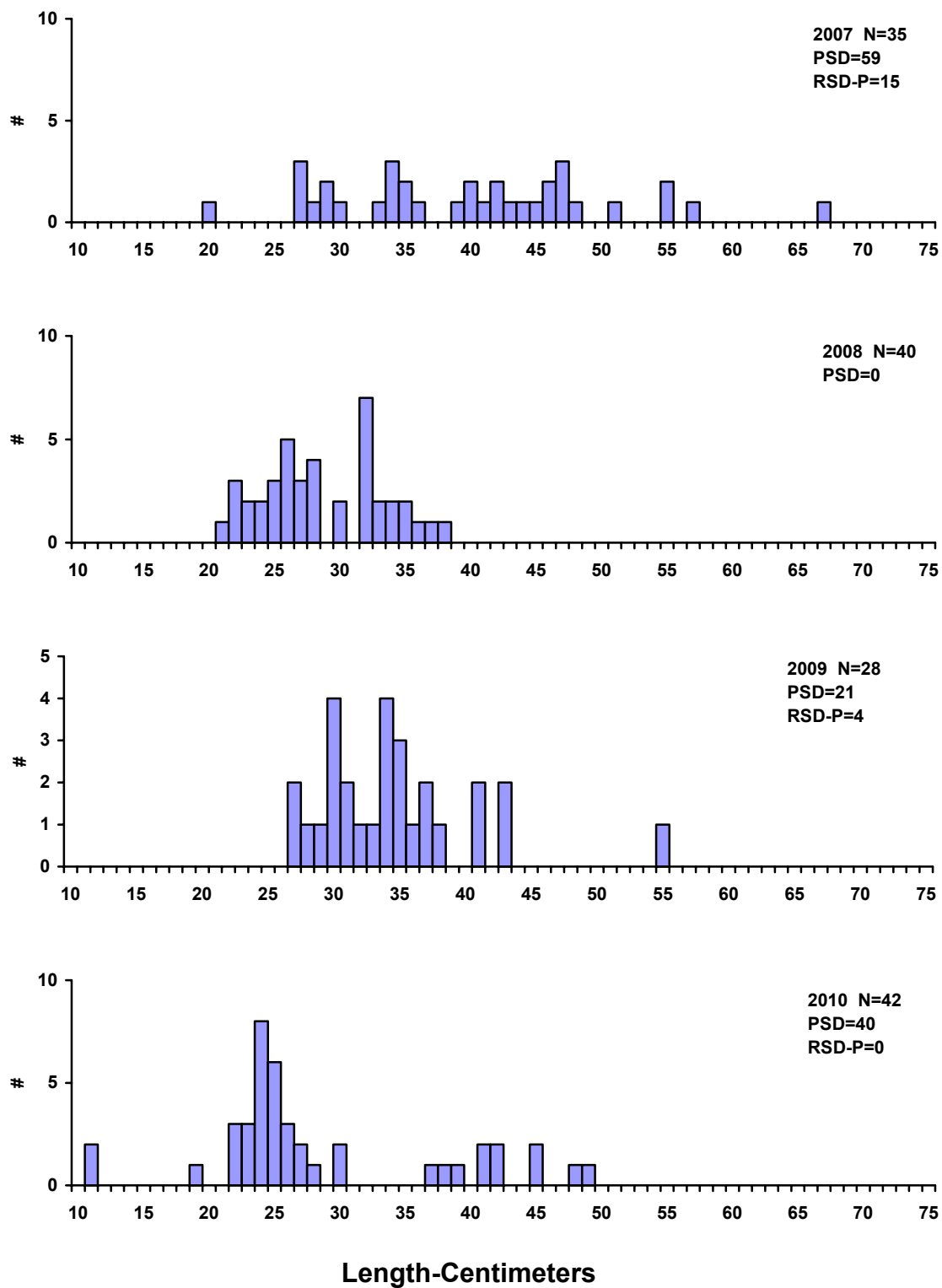
## **MANAGEMENT RECOMMENDATIONS**

1. Continue to monitor East Vermillion Lake with annual summer netting surveys to sample adult fish populations and fall electrofishing surveys to monitor walleye recruitment.
2. Develop a habitat improvement plan for East Vermillion Lake that may include periodic drawdowns, artificial structures, rock spawning reefs and fishing piers.
3. Investigate potential solutions to the poor crappie and bluegill recruitment in recent years.

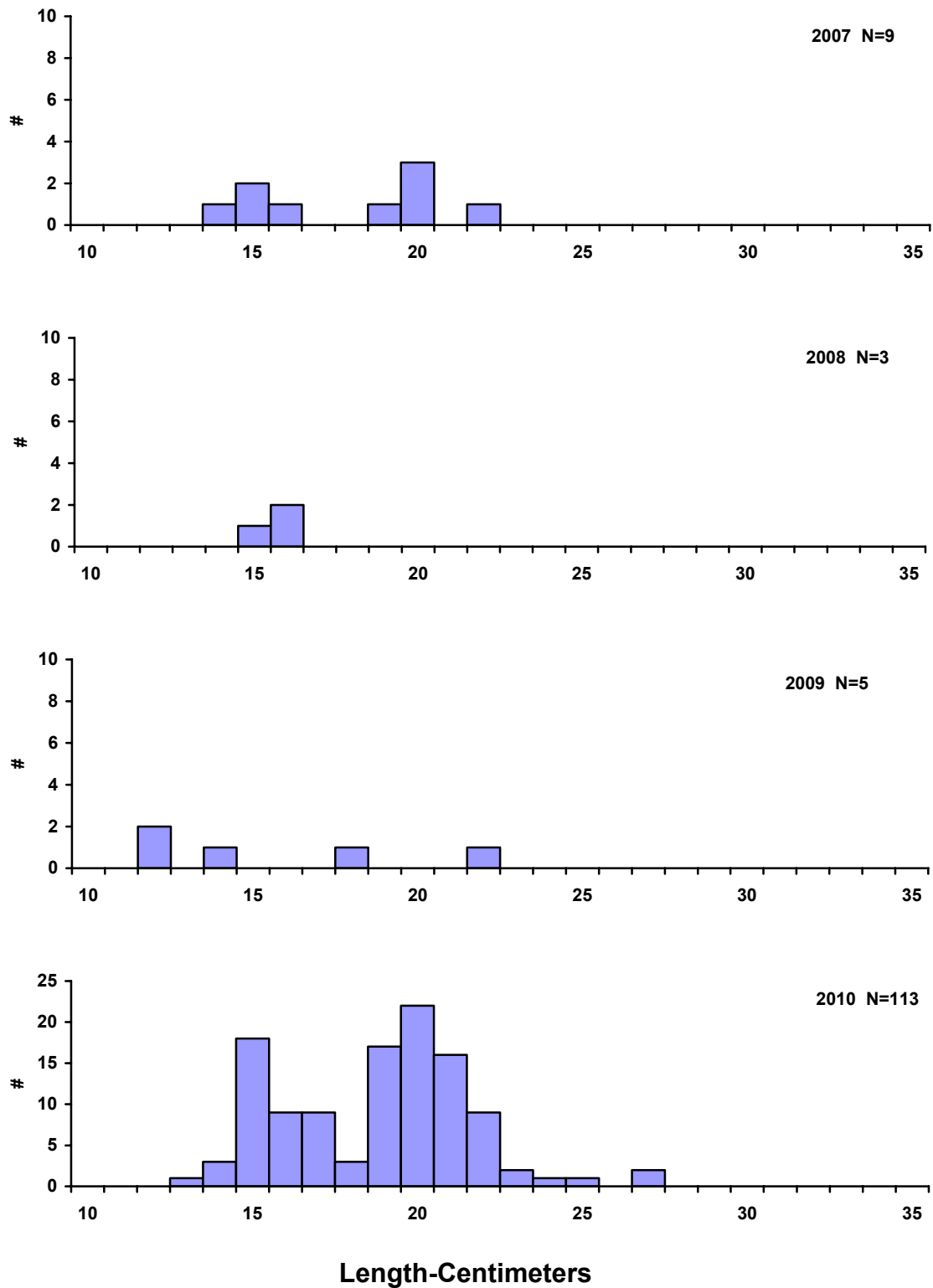
**Table 12.** Stocking record for East Vermillion Lake, McCook County, 1991-2010.

<b>Year</b>	<b>Number</b>	<b>Species</b>	<b>Size</b>
1991	6,700	Walleye	Sml. Fingerling
	6,000	Walleye	Lrg. Fingerling
1992	15,000	Largemouth Bass	Sml. Fingerling
	40,690	Largemouth Bass	Med. Fingerling
	12,824	Walleye	Lrg. Fingerling
	902	Walleye	Juvenile
	109	Walleye	Adult
	38,930	Yellow Perch	Fingerling
	1,350	Black Crappie	Adult
1995	27,500	Channel Catfish	Fingerling
	35,700	Fathead Minnow	Adult
	55,000	Walleye	Sml. Fingerling
	3,789	Black Crappie	Adult
1996	51,300	Bluegill	Fingerling
	51,300	Channel Catfish	Fingerling
	5,227	Yellow Perch	Fingerling
	102,600	Walleye	Fingerling
1999	51,300	Walleye	Fingerling
2005	16,544	Walleye	Fingerling
2006	51,425	Walleye	Fingerling
2009	1,661	Black Crappie	Adult
	1,187	Bluegill	Adult
2010	6,125	Black Crappie	Adult
	405	Bluegill	Adult

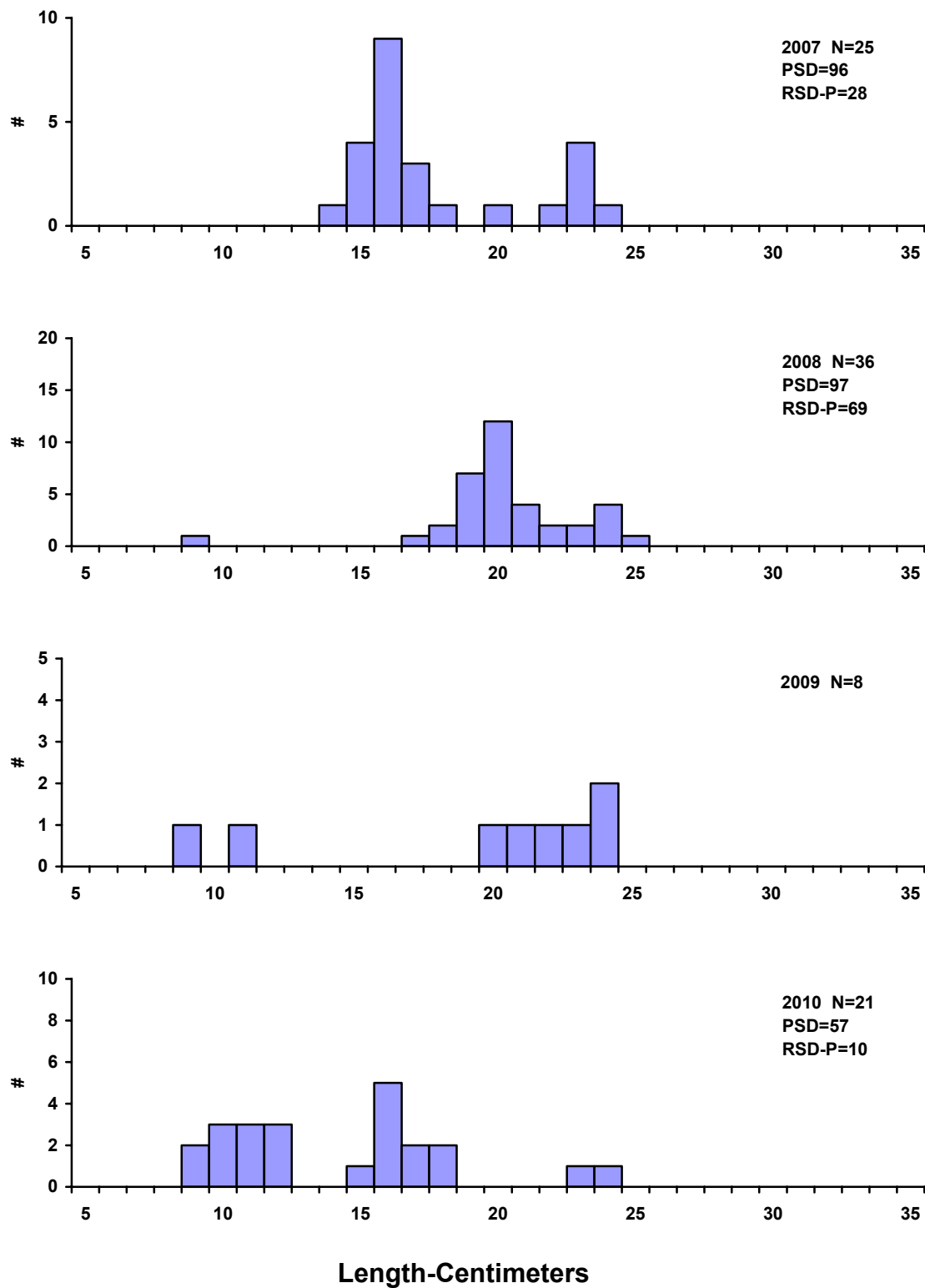




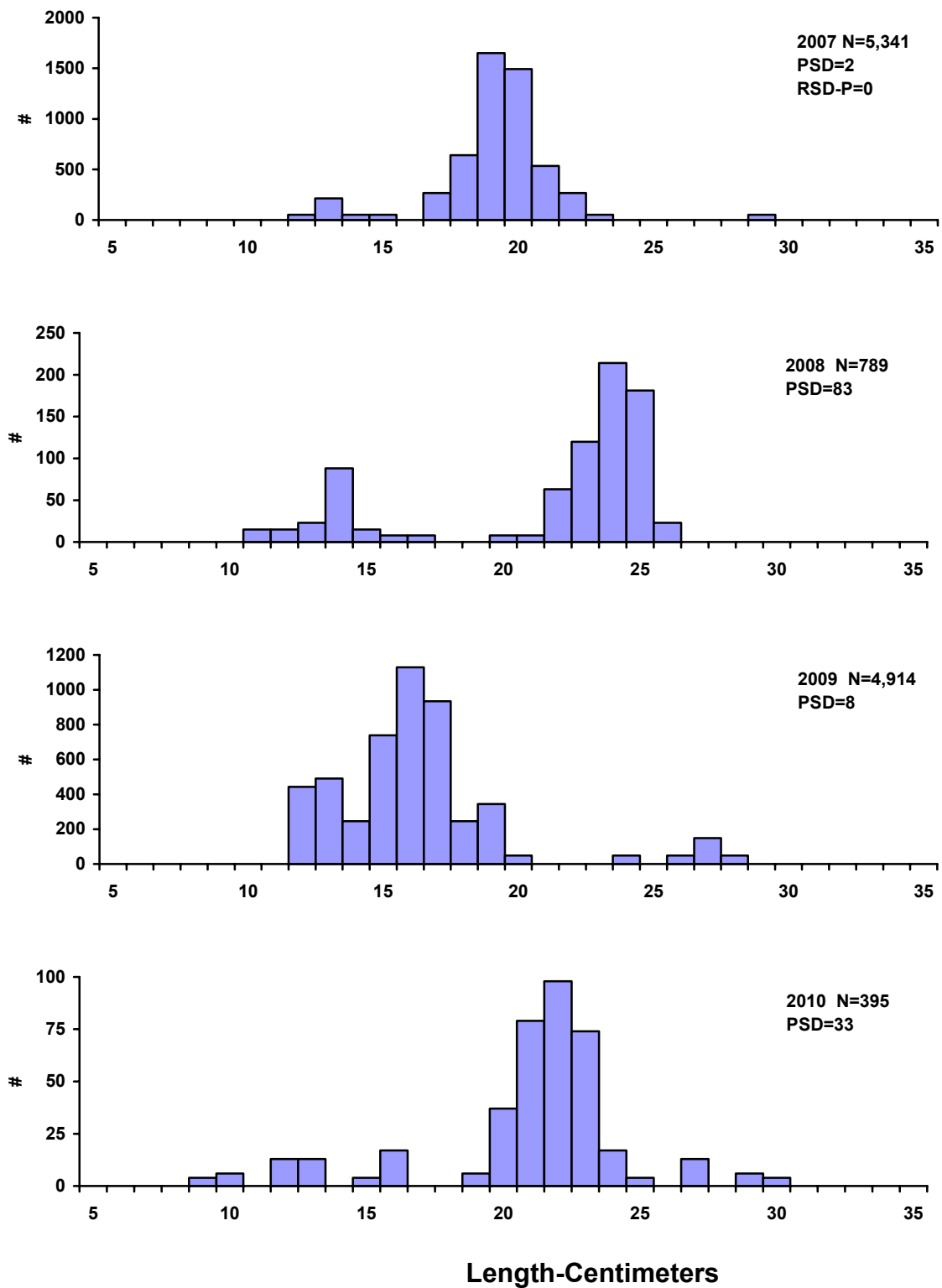
**Figure 1.** Length frequency histograms for walleye sampled with gill nets in East Vermillion Lake, McCook County, 2007-2010.



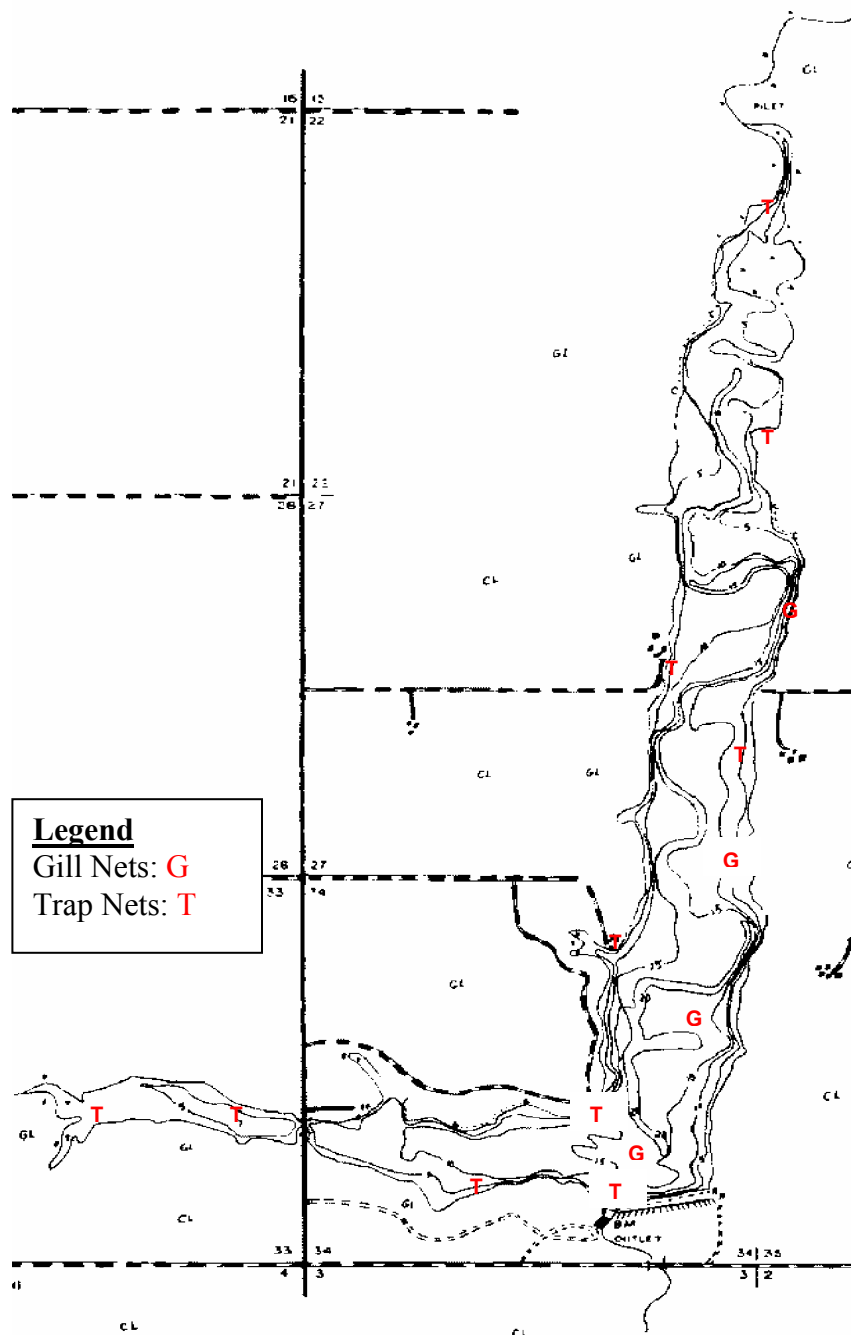
**Figure 2.** Length frequency histograms for black crappies sampled with trap nets in East Vermillion Lake, McCook County, 2007-2010.



**Figure 3.** Length frequency histograms for bluegills sampled with trap nets in East Vermillion Lake, McCook County, 2007-2010.



**Figure 4.** Length frequency histograms for black bullheads sampled with trap nets in East Vermillion Lake, McCook County, 2007-2010.



**Figure 5.** Sampling locations on East Vermillion, McCook County, 2010.

**Appendix A.** A brief explanation of catch per unit effort (CPUE), proportional stock density (PSD), relative stock density (RSD) and relative weight (Wr).

**Catch Per Unit Effort (CPUE)** is the catch of animals in numbers or in weight taken by a defined period of effort. Can refer to trap-net nights of effort, gill-net nights of effort, catch per hour of electrofishing, etc.

**Proportional Stock Density (PSD)** is calculated by the following formula:

$$\text{PSD} = \frac{\text{Number of fish} > \text{quality length}}{\text{Number of fish} \geq \text{stock length}} \times 100$$

**Relative Stock Density (RSD-P)** is calculated by the following formula:

$$\text{RSD-P} = \frac{\text{Number of fish} > \text{preferred length}}{\text{Number of fish} \geq \text{stock length}} \times 100$$

PSD and RSD-P are unitless and usually calculated to the nearest whole digit.

Size categories for selected species found in Region 3 lake surveys, in centimeters (inches in parenthesis).

<b>Species</b>	<b>Stock</b>	<b>Quality</b>	<b>Preferred</b>	<b>Memorable</b>	<b>Trophy</b>
Walleye	25 (10)	38 (15)	51 (20)	63 (25)	76 (30)
Yellow perch	13 (5)	20 (8)	25 (10)	30 (12)	38 (15)
Black crappie	13 (5)	20 (8)	25(10)	30 (12)	38 (15)
White crappie	13 (5)	20 (8)	25(10)	30 (12)	38 (15)
Bluegill	8 (3)	15 (6)	20 (8)	25 (10)	30 (12)
Largemouth bass	20 (8)	30 (12)	38 (15)	51 (20)	63 (25)
Smallmouth bass	18 (7)	28 (11)	35(14)	43 (17)	51 (20)
Northern pike	35 (14)	53 (21)	71 (28)	86 (34)	112 (44)
Channel catfish	28 (11)	41 (16)	61 (24)	71 (28)	91 (36)
Black bullhead	15 (6)	23 (9)	30 (12)	38 (15)	46 (18)
Common carp	28 (11)	41 (16)	53 (21)	66 (26)	84 (33)
Bigmouth buffalo	28 (11)	41 (16)	53 (21)	66 (26)	84 (33)
Freshwater drum	20 (8)	30 (12)	38 (15)	51 (20)	63 (25)

For most fish, 30-60 or 40-70 are typical objective ranges for “balanced” populations. Values less than the objective range indicate a population dominated by small fish while values greater than the objective range indicate a population comprised mainly of large fish.

**Relative weight (Wr)** is a condition index that quantifies fish condition (i.e., how much does a fish weigh for its length). A Wr range of 90-100 is a typical objective for most fish species. When mean Wr values are well below 100 for a size group, problems may exist in food and feeding relationships. When mean Wr values are well above 100 for a size group, fish may not be making the best use of available prey.